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Drills and Drilling Methods

By L. L. THWING

(Authors note: — The illustrations appearing with this article are designed to demonstrate the working principles of the more complicated types of early drills. Many of the prehistoric drills are illustrated in "A Study of the Primitive Methods of Drilling," by J. D. McGuire, Smithsonian Institution, 1896, and practically all of the American tools referred to are shown by photographs in "Ancient Carpenters' Tools" by Henry C. Mercer, Bucks County Historical Society, Doylestown, Pa., 1929).

Because a drill is apparently a very simple tool, we are likely to overlook its importance. If we were unable to make holes, everything would have to be made in one piece, unless it were variously stuck together. Consequently, the ability to make holes is a basic operation that is one of the corner stones of our present complicated technology. Because the drill is such an invaluable tool, it was one of the first tools developed by mankind, and was probably the first special purpose tool. That was from 50,000 to 100,000 years ago.

The first drill was probably a thorn or a sharp bone, but flint drills were made later, and today they are dug up all over the world, along with stone axes, flint knives and other tools made by men of the Stone Ages. Not only the drills themselves are found, but also many and varied examples of the work done with them. The first holes would naturally be drilled in soft substances, which have long since rotted away, but later efforts, such as drilled shells, bone, and even soft stone, are ample evidence of the drilling technique of men of the Old Stone Age. The first drill was held directly in the hand, but later it was attached to a shaft and revolved by some method which can be only surmised, but it is reasonably certain that, by 10,000 B. C., primitive man had developed methods of drilling stone that have never been improved, except in time-saving details.

The oldest drill with complete driving equipment, so far discovered, came from Egypt, and is about 5000 years old. This particular drill was a fire drill, similar to those used today by boy scouts, but similar devices were used for drilling, as is plainly shown in various Egyptian wall paintings. The discovery of many Neolithic stone drill sockets indicates that this method has been used for much more than 8000 years. Drill sockets are round stones, with a shallow hole to act as a bearing for the upper end of the drill shaft.

During the Middle Ages, alchemists were amazed when shown prehistoric beads made of stone too hard to be scratched by steel. They believed that the ancients were able to soften and re-harden stone at will. This was one of the "lost arts" along with the art of making malleable glass. Today we know that men of the Neolithic Age were able to drill holes in hard stone,

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Our Purpose

The purpose of the association is to encourage the study and better understanding of early American industry, in the home, in the shop, on the farm, and on the sea, and especially to discover, identify, classify, preserve and exhibit obsolete tools, implements, utensils, instruments, vehicles, appliances and mechanical devices used by American craftsmen, farmers, housewives, mariners, professional men and other workers.

Dues

The annual dues are one dollar, payable September first, for the year immediately ensuing. *The Chronicle* for the current year is sent to all members without additional charge. Back numbers (except No. 1) may be secured from the Treasurer for 20c each. For further information, address any of the officers. See page 5.

A Cooper's Shop of 1800

By STEPHEN C. WOLCOTT

(This article was found among Mr. Wolcott's papers, after his death. He had had the cuts made for *The Chronicle* from photographs which his memorandum states were procured through the courtesy of the Fessenden Cooperage Co. of Townsend, Mass. Unfortunately he had not carried out his obvious intention to place numerals in the text referring to those in the picture of the interior. — ED.)

In order to visualize a typical cooper's shop of this period, it is necessary to get away from the city and into a community of barrel-makers. These men were first farmers, then coopers. They lived on their own farms in fairly well-settled districts, near enough to a city or large town where their product could be sold, old enough to be safe from Indian raids, supplied with the various kinds of wood required in their work, and within a reasonable hauling distance of their market. Such hauling was done in those days by steers. As time did not greatly count, a week was not too long to consume on such a trip, delivering barrels, collecting supplies for cooper customers, and attending to numerous commissions.

The shop was located in part of the barn, or in a separate shed near the house, and usually near the main road in order to facilitate the handling of supplies and barrels. These shops, as will be seen from the accompanying illustration, were often constructed from "left-overs," and many were log houses. If it was a one-man shop, it would be about ten feet square; if, as was generally the case, two or three neighbors worked together, or journeymen coopers were employed, there would be three or four work-benches, which meant a shop twelve by twenty feet or more.

In the center at one side, or at one end, was a large open fireplace, some six feet wide by three feet deep, and five feet high. Besides warming the room, this gave space for seasoning two barrels at a time, each over its own cresset (or criset). The latter

was either an iron frame-work basket, or a heavy piece of stove pipe, eight inches in diameter by thirty inches long, mounted on three bricks. In these would be made a fire of shavings or chips, the small diameter of the cresset preventing the fire from burning the inside of the barrel. Around the sides of the room were several benches, all alike so far as equipment was concerned, except that there might be one bench especially intended for hoop-making. This was nothing more than a few boards, nailed together and mounted on brackets. Close to the outer edge and near the center, was the hoop cutter. This was a thin blade of iron, sharp on two sides, and mounted so that the upper end was about two inches above the bench and parallel to its top. Each of the other benches were more solid in construction, the front board being at least two inches thick. Mounted at the right-hand end was a wooden windlass, about four inches in diameter, with a ratchet and dog, or spring, at the back, and four iron arms, each two feet long, at the front, outside of the bench. A rope, about ten feet long, was fastened to the windlass, with the other end put through the top of the bench, near the back, and about three feet from the windlass. This was knotted to prevent its being pulled out. To the left of the windlass was a semi-circular recess, four inches deep by twelve inches wide, cut out of the front of the bench, into which the partially completed barrel was placed. Here the rope was given a turn around the still open staves. A twist on the windlass would draw these together, so that a hoop could be placed over them.

Cooper's Shop — Exterior

Further to the left, there was mounted a heavy piece of iron, rounded on top and projecting a few inches from the bench, to act as an anvil. Still further to the left, was a heading vise to hold the head, while it was being sawed with the narrow bladed bow saw, or while its edge was bevelled, with a paring or heading knife, to fit the croze or groove in the barrel. Vises of this type are very rarely found, as they were given up years ago, and, being of wood, were usually burned up. A short description of this oddly constructed device may be of interest. A piece of oak or other hard wood, an inch and a half thick by three inches wide, and long enough to reach from the floor to four inches above the bench, was firmly fastened in an opening, of the same depth, cut in the edge of the bench. Another piece of the same size was pinned, with a single wooden pin, in the same cut-out, about half an inch from the first piece. As a piece of wood hinged near the floor, at the foot of the first piece, was pushed down against the second one, the top of the latter, because of its one pivot, was forced against the top of the first piece, so as to hold anything placed between, — in this case, a barrel head. There was another way of holding the headings for this purpose. There was a V-shaped opening, cut about four inches into the top of the bench, and a corresponding opening in a piece mounted six inches below. Into these two V-shaped cuts a head could be held, by pressing against it with the body, as one worked on it.

Cooper's Shop — Interior

Beyond this vise was a piece nailed to the bench, or possibly two nails partially driven into the bench, or two small bench stops, to hold one piece of a heading, while it was bored for dowels. Near the left end of the same bench, or at times on the hoop bench, and fastened firmly, there was a smoothing "horn," a half round plank, two inches thick by four inches wide, extending some eighteen inches out from the bench. On the inside end, even with the edge of the bench, there was a peg or stop of some kind. On this "horn" a barrel could be pushed against the stop and held with the body, as the outside was smoothed up with spoke shaves. Somewhere out of the way, on a block three feet high, was the dowel former. In one corner, or possibly in the center of the room, was the shaving horse. On a rough shelf above the benches, would be found howels and crozes, with blocks of various sizes and degrees of curvature, also leveling or "sun" planes, two or three scorpers, and a frow club or two. At the back of the benches were kept ordinary carpen-

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First Porcelain Making in America

By G. A. R. Goyle

(*Continued from last issue*)

Duché, in July, 1741, was so assured of his success that he went to Frederica with specimens of his ware, to show to General Oglethorpe, and, at the same time, disclose to him "that he was designed to go soon for England, and carry with him samples of what he had brought to perfection." The General gave him letters of recommendation for England, and wrote a letter to Colonel Stephens, recommending that he lend Mr. Duché fifty pounds from the trustees' funds on hand. It so happened, at that time, that funds were low in the hands of Colonel Stephens and Mr. Jones, who was associated with the Colonel in running the affairs at Savannah, and this fact, coupled with the political differences which had grown more and more acute, prompted Colonel Stephens to withhold the emolument from Andrew Duché, until he had further consulted with General Oglethorpe. Andrew Duché's obligations to the trustees had, by that time, risen to more than 400 pounds, as we find from a letter written on July 30th, 1741, at the time of this controversy, by Mr. Jones to General Oglethorpe.

Colonel Stephens remained obstinate, in spite of repeated requests, and would not pay the recommended fifty pounds to Andrew Duché, which he needed for his trip to England. We can understand why Colonel Stephens did not want to finance Duché's trip to England, where he would ruthlessly criticize the running of the colony. The pushing of the project to make porcelain, and the intention of getting a patent for it, were, no doubt, uppermost in the mind of Duché, but such is human nature, that the one cannot see the point of view of the other, and the grandest object is thereby often frustrated.

The break between Colonel Stephens and Andrew Duché was finally complete, when on September 15th, 1741, the latter for the last time again urged his demand for the fifty pounds. In this interview, Duché proclaimed that he would not rest until he saw the use of negroes granted, and the tenure of land in fee simple, and Colonel Stephens writes in his diary: "he went off much offended."

There followed then petty annoyances which Duché had to endure from the officials. When he petitioned for land on the densely wooded Hutchinson Island, he was refused. When he cut wood there, he was stopped, and his ensuing application that he might have leave "to cut Ash Wood upon the said island to burn Earthenware with," was rejected. In June, 1742, when an invasion of the Spaniards threatened, Duché, with several others, applied for boats, to get their families higher up the river into safety. The application was refused, but Duché, with his wife, went up river "against orders," and did not return until August 1st, 1742.

Andrew Duché never gave up the idea of proceeding to England, and the treatment that he had received lately only strengthened his intentions. By his indebtedness to the trustees, through grants of land, use of servants, and advance of money for his porcelain enterprise, he was bound to the colony, and if he wanted to get away, had to leave secretly, as so many had done right along, to settle in colonies where the prospects of getting on and becoming independent were far better. Duché was an industrious worker, and finally, by the end of November, 1742, must have saved enough to see his way clear to getting away secretly on a sloop bound for the Bermudas, and thence to England. Unfortunately, the authorities had it in for him, watched his every movement, and the entry in Stephens' journal of November 20th, 1742, tells us what happened:

"Information being brought to this Board, that Andrew Duché went off in the Night last past in a clandestine Manner, in a Boat laden with divers Chests, Casks & other Effects, designing to put himself & said Goods, on Board a Sloop lying at Cockspur, which came lately from New York, & was now bound for Burmudas: And the said And^{w} Duché having taken no Permit for so doing; moreover it appearing to Us, that he had other secret Designs in View, which might be of evil Tendency in Respect to the Interest of the Trust: for these Reasons it was the unanimous Opinion of this Board, that a Boat should immediately be sent with all possible Speed & that an Officer or two should be put on Board the said Boat, with a Warrant from the Magistrate, to go on Board the said Sloop, (if happily they might find her not yet sailed) & there to apprehend the said Duché & bring him before them, that Examination might be duly made into the Premises. In the evening the Boat returned with the Officers sent, & the said Duché in their Custody; when upon strict Enquiry into the said Duché's Proceedings, it was judged necessary that he should find Sureties to be answerable to the Trustees, for such Sums of Money as he stood charged with in their Books & not to depart the Colony 'till the Trustees pleasure could be known therein: But he not readily finding such security, it was determined that he should remain in the Officers Custody, 'till Monday Morning."

Andrew Duché soon found bond for 400 pounds, not to leave the colony, and was released. Nevertheless, he was hurt to the quick by the unlawful imprisonment, and wrote a memorial concerning it to the trustees. His objection, no doubt, had merit, as the trustees would have been amply reimbursed by seizing Duché's land with all the improvements, several houses, and the pottery, which supplied Georgia's and the adjoining provinces' demands. The Earl of Egmont, upon receipt of the memorial, ordered a strict inquiry to be made in Savannah, which inquiry, carried out by Duché's enemies, could not have amounted to much.

Finally, it was through the help of General Oglethorpe that Duché could realize his plan, now several years old, to go to England. Over the heads of the authorities in Savannah, he got a pass from General Oglethorpe in Frederica, probably in March, 1743, to go to England, with the privilege "to take Virginia in his way." Our informant about this move, Charles Watson, wrote on March 30, 1743, to the trustees' secretary in London, that, on account of this contemplated stay in Virginia, "I believe he won't presently reach England, if he ever does." We wish to emphasize the fact that Andrew Duché stayed some time in Virginia, for reasons which become apparent later. Definite information that Duché finally did proceed to London, we get from a letter of John Pye to the trustees in England, written in Savannah on October 31, 1744. In it, he refers to a query proposed to the trustees by Mr. Duché, "now in England." To complete documentary evidence concerning Andrew Duché, let us add, that in September, 1746, he was apparently still abroad, for his house in Savannah was then occupied by a Mr. Wm. Spencer, who paid a rent of eight pounds per annum. There

(*Continued on page 7, column 3*)

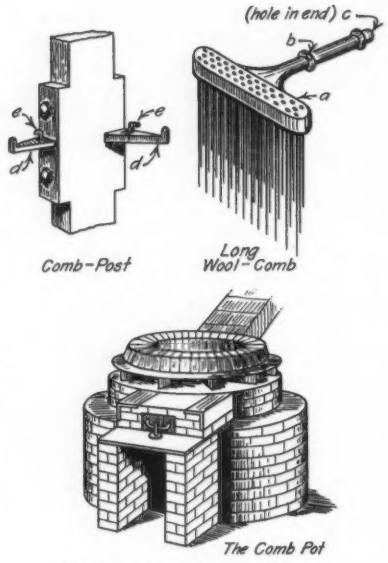
The Wool Comber

By William B. Sprague

(Continued from last issue)

"The wool-comber, in many parts of the country, appoints a day, generally once in a fortnight or three weeks, when he will meet his spinners and his *knitters,* to deliver out his wool and his worsted to be spun and knit. The poor women and girls of the village meet him on the day appointed with their work, return what they have spun or knit, and take other work instead. But the money which they obtain either at spinning or knitting, is rarely more than six-pence or eight-pence a day. The wool-comber afterwards *dresses* the stockings by stretching them on a wooden board, the shape of the leg and foot, having previously caused them to be scowered (*s.c*) or dyed, as the colour or colours require, and then he packs them up, either in a dozen or half-dozen pairs, for sale, as in the case of woven stockings." (F313).

As not infrequently happens, we must turn to the comparatively recent industrial encyclopedias of the 1850's for a thoroughly intelligible explanation of the combing process, though there is no reason to suppose that the later method of operation differed radically from the earlier, even though we see some development in the efficiency and convenience of the implements and accessories employed. Accompanying this article is a copy of Tomlinson's illustrations. Apparently the only essential respects in which the later comb *may* have been improved was that the stock (a) was covered with horn or brass — undoubtedly to eliminate any possibility of splinters or splits which would catch in the wool, —that the handle was bored through at about the middle (b) and also had a hole in the end (c), and that the first combing, when the fibres were most entangled, was done with combs having only two rows of teeth — or *broches,* as they were sometimes called (B286),— the finishing being done with one of three rows (E1315, K1041), or even, for the finest work, as many as six (B286). The post, a fixture in the shop, had one or more iron "stems" or hooks (d) projecting from it horizontally. The turned-up part of this stem was to pass through the hole in the middle of the handle of the comb (b) and the "staple point" (e) set in the post near the base of the stem was to enter the hole in the end of the handle(c),



Wool Comber's Equipment

the comb thus, when desired, being inverted and securely fixed to the post (E1315, K1041). The "comb-pot" of these times (and note the survival of the old name) consisted merely of a flat iron plate, heated by fire or steam, surmounted by a similar plate, at an interval sufficient to allow the teeth of the comb to be inserted between them at one side, which was left open, while

Wool Combers
Source unknown. Probably European.

the space between the edges, on the other sides, was closed to confine the heat (E1315, K1041).

"In combing the wool, the workman takes it up in tresses of about four ounces each, sprinkles it with oil, and rolls it about in his hands, to render all the filaments equally unctuous. Some harsh dry wools require one-sixteenth their weight of oil, others no more than a fortieth. He next attaches a heated comb to the post, with its teeth pointed upwards, seizes one-half of the tress of wool in his hands, throws it over the teeth, then draws it through them, and thus repeatedly, leaving a few straight filaments each time upon the comb. When the comb has in this way collected all the wool, it is placed with its points inserted into the cell of the stove, with the wool hanging down outside, exposed to the influence of the heat. The other comb, just removed in a heated state from the stove, is planted upon the post, and furnished in its turn with the remaining two-ounce tress of wool; after which it supplants the preceding at the stove. Having both combs now hot, he holds one of them with his left hand over his knee, being seated upon a low stool, and seizing the other with his right hand, he combs the wool upon the first, by introducing the teeth of one comb into the wool stuck in the other, and drawing them through it. This manipulation is skilfully repeated, till the fibres are laid truly parallel, like a flat tress of hair. It is proper to begin by combing the tips of the tress, and to advance progressively, from the one end towards the other, till at length the combs are worked with their teeth as closely together as is possible, without bringing them into collision. If the workman proceeded otherwise, he would be apt to rupture the filaments, or tear their ends entirely out of one of the combs. The flocks left at the end of the process, because they are too short for the comber to grasp them in his hand, are called *noyls.* They are unfit for the worsted spinner, and are reserved for the coarse cloth manufacture. The wool finally drawn off from the comb, though it may form a uniform tress of straight filaments, must yet be combed again at a somewhat lower temperature, to prepare it perfectly for the spinning operation. From ten to twelve slivers are then arranged in one parcel." (E 1315, see also K 1041, B 287). Care was taken to produce slivers of even thickness, and for this purpose, a bone ring was often used as a guage (B 288).

Some further side-lights on this interesting trade, as practiced in England, are found in the following quotation:

(Continued on page 6, column 3)

Early American Industries Association

Early American Industries Association

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Communications should be addressed as follows: Pertaining to The Chronicle, to W. B. Sprague. Applications for membership, to S. E. Gage. Suggestions for prospective members, to A. E. Lownes. Other matters to E. T. Goodnow. Addresses as above.

This issue was printed by Leon S. Case Flushing, N. Y.

W. B. Sprague, *Editor.*

Chronicle No. 1

When our first issue was published, we had but twenty-six members, and failing to foresee the widespread interest in the association which immediately developed, two hundred copies appeared to be an ample supply for all conceivable purposes. This supply has been long since exhausted, and many members have made anxious inquiries as to the possibility of obtaining a reprint of this number in order to complete their files. The "set-up" of Number I was identical with that of Number 2, except that it had but four pages instead of eight. Its contents consisted principally of a statement of the aims of the association, an account of the organization meeting, advice to tool collectors, "points" of interest, and the like. To reprint this would cost in the neighborhood of $40. When our membership has grown to a point where we believe that at least two hundred members will pay twenty cents for a copy of it, we expect to arrange for the reprint, and offer it at that price. We would like to hear from those who would order one or more copies.

Voluntary Contributions

The response to the appeal for voluntary contributions, contained in our last issue, has not been so prompt as we had hoped. While cheques are still coming in, many members have yet to be heard from. With funds now in hand, and with the expected normal increase in membership, based on experience, it would appear that we can finance five issues this year, including the three which have already appeared, but we hope very much that, with this reminder, enough additional contributions will be received to cover the cost of one more number, thus maintaining the bi-monthly schedule of publication.

The Rushlight Club

The November meeting was held at the headquarters of the Society for the Preservation of New England Antiquities in Boston. After a lengthy business session, this Society's collection of lamps was exhibited, and the patented ones were discussed by Dr. Rushford in a most interesting and instructive talk. The club now has ninety-five members, and has commenced the publication of *The Rushlight*, a four-page, mimeographed paper, of which two issues have appeared. The contents consist of accounts and announcements of the club's activities, suggestions from the officers toward making the club more useful and effective, lists of books and articles on the subject of lighting, as well as many short items of interest to the lamp collector.

Brooms are at least as old as the first century A. D., as brooms made of palm leaves are mentioned as being used by Roman bakers and millers. The artist's hair-filled brush is much older, and was used by early Greek painters. Its invention is attributed to Appollodorus (*circa* 420 B. C.) Wire scratch brushes were described by Theophilus (1100 A. D.). The first brushmaker known by name was Hans Schoen, of Nuremburg, who lived about 1520.

Skates were used about a thousand years B. C. In the neighborhood of Berlin, specimens have been found made of the bones of horses. In the middle of the thirteenth century A. D., bone skates were superseded by iron ones.

Two Hints

At the sale by auction of the collection of the late Henry D. Paxson, a few months ago, considerable attention was attracted by a scoop net, a factory-made affair, with a very long wooden handle, and the meshes made of chain, the purpose of which, it was stated with considerable positiveness, was to catch snapping-turtles, which would bite their way out of an ordinary net! We cannot help but admire the ingenuity of the person who evolved this theory, but we find illustrated in the 1910 catalogue of the Gruman Ice Tool Works, Branchville, Conn., an identical net, which is recommended "for scooping the small particles of ice from the channel which so hinder the moving blocks of ice. It is very superior to shovels or forks. The water quickly passes through its meshes, and never becomes clogged with ice." The moral of this little tale is two-fold. First, while everyone is entitled to his own guess as to the function of an unidentified implement, we should all be cautious about accepting theories, in the absence of indisputable proof of their validity. Secondly, modern catalogues of tool manufacturers will often give helpful clues along these lines, and all collectors should have on hand, for reference, as many of such catalogues as possible. A very comprehensive list of such manufacturers will be found in Thomas' Register.

New York Meetings

The series of informal meetings in New York, as outlined in our last issue, has not been commenced, owing to the intervention of the holidays, and the almost continuous absence from the city of Mr. George S. McKearin, who is to take charge of the arrangements. It is expected that the first meeting may be held early in February, and anyone who wishes to be notified of the time and place, should advise Mr. McKearin, at 80 Maiden Lane, New York.

According to an old-timer, wooden canteens or field barrels were in universal use by farmers and farm-hands in northwestern Connecticut when he first came there in 1872. Specimens are known, however, bearing unquestionably authentic dates of the 18th century.

Drills

(*Continued from page* 1, *column* 2)

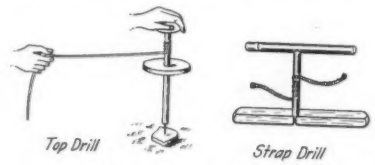
from the size of a pin to four inches in diameter. We know this, because there are many such small holes in the thousands of prehistoric beads in our museums. We know that they could drill the larger holes, because such holes still exist in old Egyptian quarries. Again the methods used were the same as those used today. We are able to do the work quicker and to dimension, but, other than that, there has been no improvement in thousands of years.

Various methods were used. The smallest holes were drilled by revolving a bristle, dipped in sand, against the work. The larger holes were drilled with a core drill. The writer has examined and measured a number of turquoise matrix beads at the New York Museum of Natural History. These beads were drum shaped, about a quarter of an inch in diameter, and half as thick. They were pierced with a hole a little larger than a common pin. This hole is in the exact center, it is not "bell-mouthed," and all diameters of the same bead are equal, to within a thousandth of an inch. That is, they are truly cylindrical within the above limits, and that is automobile accuracy.

The many things that Stone Age men have accomplished with their crude drilling devices are truly amazing, but a bit out of our line of interests. Still it is well to know that the art of drilling is one of the oldest arts, and also an art in which prehistoric man seems to have been relatively far advanced.

The first description of a drilling process is found in Homer's Odyssey (*circa* 900 B.C.) Three men were required to drill a hole for trenailing a ship's timbers. One stood erect and held the drill shaft, around which were one or two turns of a leather thong. Two assistants, kneeling on opposite sides of the drill, held the thong tight and pulled alternately, thus giving the drill a few revolutions, first in one direction and then in the other. This device is known as a strap drill. Where the flat drill for metal and the spiral type of gimlet for wood were invented is not known, but both were used in the first centuries of the Christian era. These often had square taper shanks, presumably for cross handles. The bit-stock or brace is not found among either Egyptian or Roman relics. About 1100 A. D., Theophilus first described the pump drill. This is an excellent drill for small holes, and has been independently invented by primitive races all over the world.

Until the invention of printing and wood cuts for illustration, our knowledge of the exact form of the drill point is limited, as it is necessarily based either on descriptions, of which there are none of any value that I know of, or on the drills themselves, many of which have been dug up in various parts of the old Roman Empire. Unfortunately, most of these are so rusted and corroded that the actual cutting points of the drills for metal are lost. Of gimlets and augers there are enough extant to assure us that, by 500 A. D., there was nothing left to invent, except the modern twisted auger and twist drills. Roman bits, dug up in Switzerland and in the Saalsburg, plainly show that carpenters of



that date had twisted gimlets and pod or spoon augers. With the two above exceptions, we have improved drills and augers only in details, over a period of 1500 years. Spiral augers have not been in common use for over a hundred years, nor the machinist's twist drill for over seventy.

The foregoing is a brief outline of the background of drilling and boring tools that our forefathers brought from Europe. The following different drilling tools and devices were used from colonial times down to the present: awls, gimlets (or wimbles), augers, center bits, and metal drills.

Awls may be of round cross section, sharpened to a square cutting edge on the end, or they may be of square section and tapered. Gimlets generally are simply small augers, and these have changed very little in 1500 years. They may be made of flat twisted steel or of the pod type, either twisted or straight, with or without a short tapered screw at the end. It should be noted that some gimlets of the pod type have thin, sharp, cutting edges on the sides, and make chips, while others simply crowd the wood aside. It might be thought that the gimlets with the screw tip are the most modern, but they are at least as old as 1677, as Moxon (Mechanick Exercises or the Doctrine of Handy Works) says of them: "The gimlet . . . .hath a worm at the end of its bit. Its office is to make a round hole in those places where the stock of the piercer (i.e., bit-stock) . . . will not turn about . . ." Moxon also makes it clear that a "bitt" is any drilling tool used in a bit-stock. He even refers to the steel part of a cross-handled auger as a bit.

(*Continued in next issue*)

The Wool Comber

(*Continued from page* 4, *column* 3)

"The journeymen work by the piece, and will earn from sixteen to twenty shillings per week. Like people in many other trades, they often make holidays in the early part of the week. They come on a Monday morning, and having lighted the fire in the comb-pot, will frequently go away, and, perhaps, return no more till Wednesday, or even Thursday. The men in this trade have a curious custom, the same with the hatters when out of work; they set out in search of a master, with a sort of certificate from their last place; this they call going on the *tramp;* and at every shop where they call, and can get no employment, they receive one penny, which is given from a common stock, raised by the men of that shop. A spare bench is always provided in the shop, upon which people on the *tramp* may rest themselves." (F 372).

References

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Early American Industries Association

New Members

Please check your name and address and advise Mr. Goodnow of any corrections. The total membership is now 397. (This figure takes into account the fact that forty-three of our last year's members have thus far failed to renew for 1934-5, and have therefore automatically been dropped from the rolls. We still hope that many of them will apply for reinstatement).

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Connecticut Historical Society, *Hartford, Conn.*
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RECIPE, for making the Vegetable Oil to burn in Lamps, superior to Oil or Gas. To one gallon of 90 or 95 per cent. Alcohol, add one quart of rectified Spirits of Turpentine, or as much as the Alcohol will cut and become transparent, by shaking them together in a bottle; to the above, add one quarter ounce of Oil of Rosemary; then the article is fit for use. Extinguish the light when you fill the lamp. Keep the vessel containing the FLUID, well stopped.

P. S. If the Oil of Rosemary is too highly rectified to give it the desired color, add a little Curcuma.

Museum Notes

Forgotten Tools and Trades

By U. Waldo Cutler

In following many an old back road of Worcester County, we are sure to come upon some abandoned mill or half-demolished, over-grown mill-dam. There is something pathetic in these forsaken centers of contented, productive industry, and there is entertainment, as well as profitable study, in trying to re-think the process employed in using the old tools now lying forgotten there. One trade, at such a cross-roads center, often suggested some further use of the same source of power, and the modern student of life and livelihood, on the ground he calls his own, may find abundant source-material close at hand. Our ancestors were specialists in thrift as a personal responsibility, but their thrift was variously applied to the problem of making a living and a life. The farmer in summer was a wheelwright in winter; the blacksmith was also a machinist and perhaps a veterinary. A housewife was a needle-woman afternoons and a district nurse by night. Specialization in its modern sense was, perhaps fortunately, unknown to the earlier New England generations. Every farmstead was a trade school; every workday was a vocation test; every Sunday a religious education council; every home a girl — or boy — scout camp of a sort. One such industrial center has newly come to the knowledge of our Historical Society, hidden away from any popular tourist route across Worcester County. In this case, the source of power was not a farm brook, dammed up in winter to run the farm or village mill. The shop, just across the driveway from the historic dwelling, was run by a tread-mill, still in working order, but idle. Near it is the primitive forge, its bellows still intact, its tools all there, but the sea-coal fire has been cold for years. Over near the corner is a primitive lathe, once efficient by foot power. In the loft are appliances that belonged to the wheel-wright's trade; not far away is the cobbler's bench, overturned and dusty, but craving opportunity for service; below in the cellar was the cider mill, its screw still in place. Space prevents the suggestion of other useful industries once active under this now tumbling roof, on this now trembling floor. Doubtless, in the homestead kitchen across the driveway, there are also the original signs and symbols of all the primitive textile employments that absorbed the time and thought of the women-folk, — time and leisure that we moderns believe we must have for recreation. Such a "rubbish heap" as this old-time deserted *shop* of a thriving, thrifty, versatile but, in a way, specialized Worcester County farmer is a true resource for the Historical Society, for out of its waste of material can be reconstructed the early chapters of the fascinating story of our boasted modern "prosperity." The conservation of such educational resource is a matter of importance beyond the conception of too many fast-driving, free-spending, one-track representatives of industry as we know it to-day.

A Cooper's Shop

(*Continued from page 2, column 3*)

ter's planes, chisels, gouges, punches, dowel bits and a brace, a cooper's adz, a flagging iron, several drifts or hoop-drivers, chamfering knives, and variously shaped draw-knives. A grind-stone stood in one corner. Somewhere there was a bunch of flag, used in calking liquid barrels and tubs. On the walls were hung a narrow bladed bow saw, truss hoops of several sizes, a wooden compass, bung borers, and several frows. In the center of the room was a chopping block, usually a couple of feet in diameter and two or three feet high, with a cooper's axe, and possibly a hatchet, imbedded in it.

When the fireplace was at one end of the room, a stove was placed near the center, to warm the whole building. With a jack (or squaw) of two different sizes, for barrels and for half-barrels, an assembling tub or two under a bench, the outfit of the cooper's shop was complete, except, of course, for a lot of staves, headings and hoops, piled up at one end or in the loft above.

Porcelain Making

(*Continued from page 3, column 3*)

follows a long period of twenty-eight years before we find again any reference to Andrew Duché, and then it was in his old home-town, Philadelphia, where he, styled as "Gentleman," paid 12 pounds, 10 shillings, city tax, for the year 1774. Four years later, in 1778, his life came to an end, as we gather from his will probated in Philadelphia.

(*Continued in next issue*)

COMMUNICATIONS

From MR. FRANK K. SWAIN:

"The Pennsylvania Scythe article was most interesting. If you draw a straight line through Doylestown from east to west, you have Pennsylvania Germans on the north, and English on the south, — mostly Quakers. The line is distinct. Coming from the English side, I never saw or heard of a *dengel sense*, until I went to Dr. Mercer's in 1896. No hammers, anvils or cows' horns were lying about old buildings, as we found later in the Pennsylvania German section. In 1925, I called on an antiquarian near Winchester, England, and saw many interesting things. He brought out what he considered "a very curious chisel and hammer," which had been found, a short time before, buried in the crotch of an old tree, where they had been placed perhaps a century before, and grown over and hidden. Of course they were identified by me, though, to this day, I think the antiquarian doesn't believe I knew a thing about it. The anvil was your E and the hammer D. They certainly were rare in England. I always understood that the hole in the anvil was to help pry it up out of the stump, but with what used as a lever, I do not know." [We have also heard it stated that this was the purpose of the hole, but none of the old-timers, from whom we have heard, remember its being used that way. — ED.]

Mr. Newton C. Brainard is endeavoring to compile a list of the makers of early moulding planes, as taken from the tools themselves, and will be grateful for any such names, with full details, which other members may send him. His address is P. O. Drawer 2066, Hartford, Conn.

[We have heard that several purchasers of early New England houses in recent years have found, stored away on the premises, a set of moulding planes which had apparently been used in the construction of that particular house, and the explanation has been offered that they were deliberately left there for replacement purposes. Further light on this subject would be welcome. — ED.]

Mr. E. T. Goodnow calls attention to two worth-while publications in which some of our readers may be interested: *Samuel Slater and the Oldest Cotton Machinery in America*, by Frederick L. Lewton, No. 2907, procurable from the United States Printing Office at Washington, and *Transactions of the Society for the Promotion of Useful Arts* (an early 19th century organization for the encouragement of agriculture, arts and manufactures) which may be consulted at the New York State Library, at Albany.

From MR. GEORGE D. SEYMOUR:

"Throughout our Connecticut countryside one sees many houses of the better sort, particularly of the pillared Greek-revival type, set off with two evergreen trees placed on either side of the front door. Have any of your readers inquired into this tradition? When and where did this custom originate, and how *widely* was it practiced? The two trees are said to symbolize "Father and Mother." In front of the present mansion (built 1776) on the birthplace of Captain Nathan Hale stand two splendid Norway spruce trees, supposed to have been planted about 1800. One day an Italian visitor to the shrine looked up at these trees and, to the writer's great surprise, ejaculated 'Adamo and Eva!' The writer has often inquired about this old custom, widely observed at least in Connecticut, and hopes that someone, seeing these lines, may enlighten him about it."

With reference to Mr. H. M. Darby's inquiry, published in our last issue, we find the following statement about the anvil, in a book of 1820: "At one end is a hole for the purpose of cutting red hot iron, and into which is fixed a steel chisel or spike when necessary." Of course, the hardy may have been known long before that date.

"POINTS" OF INTEREST

The plant Mullen, *Verbascum Thapsus*, has a curious connection with candles. The Anglo-Saxon form of the name *molegn* is explained by the Middle Latin *calmum*, the droppings of a candle which adhere to the sides of a candle or of the candlestick. Another old name of the plant is Candlewick Mullen, because anciently it was covered with tallow and used as a candle or torch. The variants Hag-taper and Hedge-taper also occur, by reason of its use as a taper.

The oldest metal anvil in the world is preserved in the Landesmuseum in Zurich. It was found in one of the Swiss lake villages, and is about 10,000 years old. It is made of bronze and is about two inches square on the top face. It has a horn on one side, and is pointed at the bottom like a plumber's stake. There may well be stone anvils 100,000 years old, as stone-age men used an anvil in chipping their flints. The anvil is therefore one of the oldest secondary tools, — a tool used to make another tool.

An engraving, published about 1670, shows a baker's oven arranged for continuous production. The oven itself was longer than usual, and a track ran its entire length and was continued to the rear. The unbaked loaves were loaded on the track, and slowly pushed through the oven, — not a continuous motion, but a push every fifteen minutes or so. This method has long been used in the glassmaker's annealing leer, (oven) and within the past decade has been applied to baking various products.

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